

PRELIMINARY AMENDMENT

Appln. No.: National Stage Entry of PCT/JP03/11027

Attorney Docket No.: Q86418

AMENDMENTS TO THE SPECIFICATION

Please replace the first full paragraph on page 24 with the following amended paragraph:

The above second spring element 24 is specifically a metal spring, one end thereof is attached to a spring attachment portion 24m formed almost at the center of the cylinder body (damper body) 23B of the damper 23, and the other end thereof is attached to a spring receiving portions 24n installed on the above knuckle attachment plate 26. In the above in-wheel motor system of the prior art, as the relatively heavy cylinder of the damper ~~52~~ 92 for supporting the motor 3 is fixed to an unsprung portion (knuckle 5), the unsprung mass slightly increases. In this embodiment, as the above cylinder body 23B is interposed between the above damper 23 and the above second spring element 24 in series, the above heavy cylinder body 23B can be separated from the unsprung mass by the above second spring element 24. Therefore, the unsprung mass can be further reduced and the road holding properties of the vehicle can be further improved.

Please replace the second full paragraph on page 35 with the following amended paragraph:

Further, when the spring constant k_3 of the spring supporting the motor in the horizontal direction corresponding to the ~~second~~ first spring element is made smaller and the damping force c_3 of the damper is made larger than those of the above Example 2 as in Example 3, variations in the longitudinal force of the tire at a frequency from 10 Hz to the unsprung resonance frequency can be greatly reduced as compared with Comparative Example 1.

Please replace the last paragraph on page 36 bridging page 37 with the following amended paragraph:

In the in-wheel motor system of the prior art shown in Fig. 73, the motor 3 is supported to the unsprung portion of the vehicle by the spring member 93 and the damper 92 arranged parallel to each other. In the damping mechanism 20Z of this Embodiment 2, the damper 25 with a

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spring element which comprises the damper 23 and the second spring element 24 connected to the damper 23 in series as the second damper element and is arranged parallel to the first spring elements 22 and the damper 23Z is added to the first spring elements 22 corresponding to the above spring member 93 and the damper 23Z which is the first damper element corresponding to the above damper ~~52~~ 92.

Please replace the last paragraph on page 44 bridging page 45 with the following amended paragraph:

In the damping mechanism 20X of this embodiment, when the motor 3 vibrates in the wheel 2 by the input of vibration from the road when the vehicle runs on a bad road, the operation speed of the composite connection damper 25S for connecting the motor 3 and the knuckle 5 increases as its vibration frequency becomes higher. That is, while the first spring element 22 functions as a damper having a fixed spring constant at any frequency in the in-wheel motor system of the prior art shown in Fig. ~~73~~ 74, as the spring element 25s is connected in series to the spring element 23s and the damper element 24s connected to the spring element 23s in parallel in the above composite connection damper 25S, the damping force of the damper element 24s is low at a low frequency band at which the operation speed is slow and the above composite connection damper 25S functions as a weak spring in which the spring element 23s and the spring element 25s are connected in series. The damping force of the above damper element 24s increases at a high frequency band at which the operation speed is fast to fix the above spring element 23s connected to the above damper element 24s in parallel, whereby the composite connection damper 25S functions as a hard spring consisting of only the spring element 25s. By arranging the above composite connection damper 25S parallel to the damper element 23Z, vibration having a frequency near the relatively high unsprung resonance frequency can be more effectively suppressed. Therefore, variations in the ground-contact load of the tire at a frequency near the unsprung resonance frequency can be reduced and the road holding properties of the vehicle can be further improved.

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Please replace the first paragraph on page 46 with the following amended paragraph:

In the above embodiment, the vertical vibration of the vehicle is reduced. As shown in Fig. 35, an intermediate plate 26' is prepared, a plate 36 having the above connection damper ~~25S~~ 35S and the damper element ~~23Z~~ 33Z arranged parallel to each other is mounted to the motor attachment plate 27 side of the intermediate plate 26', this plate 36 and the intermediate plate 26' are assembled together by four direct-acting guides 31 for guiding in the horizontal direction, arranged symmetrical to the center of the plate, and this plate 36 is fitted onto the axle 6 connected to the knuckle 5 to provide a dynamic damper effect in the horizontal direction in addition to the vertical direction of the vehicle. Therefore, variations in the ground-contact load of the tire can be further reduced, and variations in the longitudinal force of the tire can be further suppressed.

Please replace the last paragraph on page 46 bridging pages 47 and 48 with the following amended paragraph:

In the above embodiment, the in-wheel motor 3 is supported to the knuckle 5 in the vertical direction by the composite connection damper 25S and the damper element 23Z arranged parallel to the composite connection damper 25S. As shown in Fig. 37, even when a second composite connection damper 25T in which a spring element 23t and a damper element 24t connected in parallel are connected to a damper element 25t in series is prepared and the non-rotating side case 3a of the motor 3 is connected to the knuckle 5 by a damping mechanism 20Y comprising the above composite connection damper 25S and the above second composite connection damper 25T arranged parallel to the composite connection damper 25S, variations in ground-contact load at a frequency near the unsprung resonance frequency can be reduced. Fig. 38 shows an example of the second composite connection damper 25T. In this second composite connection damper 25T, a rubber bush 25G is attached to the cylinder body ~~25b~~ 24b of the damper element 25t and mounted to the intermediate plate 26'. Since the rubber bush 25G composed of a rubber elastic body is a spring/damper element, a member for connecting the

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spring element 23t and the damper element ~~25t~~ 24t in parallel can be constructed. Since the cylinder portion of the damper element 25t can be interposed between the spring element 23t and the damper element 24t due to the above constitution, the unsprung mass can be reduced and the road holding properties of the vehicle can be improved.

Please replace the first full paragraph on page 48 with the following amended paragraph:

At a low frequency band, damping force is low as the operation speed of the above damper element 25t is slow and the above second composite connection damper 25T serves as a damper. At a high frequency band, the damping force of the above damper element ~~24s~~ 24t is high, and the above spring element 23t moves, whereby the above second composite connection damper 25T serves as a spring as the timing of generating damping is delayed. That is, the above second composite connection damper 25T can change a whole spring constant by frequency like the above composite connection damper 25S. Therefore, as shown in Fig. 36, when the in-wheel motor 3 is supported by using the above second composite connection damper 25T and the above composite connection damper 25S, variations in the ground-contact load of the tire at a frequency near the unsprung resonance frequency can be further reduced.

Please replace the first paragraph on page 49 bridging page 50 with the following amended paragraph:

In the above table, m_1 is the unsprung mass of a wheel or the like, m_2 is the sprung mass of a body or the like, m_3 is the mass of a motor as a dynamic damper, m_4 is the mass of a cylinder as a dynamic damper (second composite connection damper), m_5 is the mass of a cylinder as a dynamic damper (composite connection damper), k_1 is the constant of the longitudinal spring of the tire, k_2 is the constant of a spring in the vertical direction of the suspension, k_3 is the constant of a motor supporting spring, k_4 is the constant of a damper supporting spring, k_5 is the constant of a spring constituting a damper + spring parallel unit connected to the motor supporting spring in series, c_1 is the coefficient of damping in the vertical

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direction of the tire, k_2 c_2 is the coefficient of damping in the vertical direction of the suspension, k_3 c_3 is the coefficient of damping in the vertical direction of the motor supporting damper, k_4 c_4 is the coefficient of damping in the vertical support direction of the damper connected to the motor supporting damper in series, and k_5 c_5 is the coefficient of damping in the vertical support direction of the damper constituting the damper + spring parallel unit connected to the motor supporting spring in series.

Please replace the second paragraph on page 53 bridging page 54 with the following amended paragraph:

In the above table, m_1 is the unsprung mass of a wheel or the like, m_2 is the sprung mass of a body or the like, m_3 is the mass of a motor as a dynamic damper, m_4 is the mass of a cylinder as a dynamic damper (second composite connection damper), m_5 is the mass of a cylinder as a dynamic damper (composite connection damper), k_1 is the constant of the longitudinal spring of the tire, k_2 is the constant of a spring in the horizontal direction of the suspension, k_3 is the constant of a motor supporting spring, k_4 is the constant of a damper supporting spring, k_5 is the constant of a spring constituting a damper + spring parallel unit connected to the motor supporting spring in series, c_1 is the coefficient of damping in the horizontal direction of the tire, k_2 c_2 is the coefficient of damping in the horizontal direction of the suspension, k_3 c_3 is the coefficient of damping in the horizontal direction of the motor supporting damper, k_4 c_4 is the coefficient of damping in the horizontal support direction of the damper connected to the motor supporting damper in series, and k_5 c_5 is the coefficient of damping in the ~~vertical~~ horizontal support direction of the damper constituting the damper + spring parallel unit connected to the motor supporting spring in series.

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Please replace the second full paragraph on page 68 with the following amended paragraph:

61 is a first annular dust boot interposed between the end opposite to the end to which the above flexible coupling ~~20~~ 10 is mounted of the rotating side case 3b of the motor and the end opposed to the above end of the wheel 2, and 62 is a second annular dust boot interposed between the end to which the above flexible coupling 10 is mounted of the above rotating side case 3b and the end opposed to the above end of the wheel 2 to store the above flexible coupling 10.

Please replace the first full paragraph on page 72 with the following amended paragraph:

Since the stiffness in the radial direction of the above second annular dust boot ~~61~~ 62 can be reduced by making wavy the sectional form in the direction perpendicular to the axis of the above second annular dust boot 62, the flexible coupling 10 can be also moved smoothly.